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Measuring Human Capital Formation in Sweden in the Nineteenth and Early Twentieth Centuries

Florian Waldow^{*}

Abstract: Educational expenditure is an important and widely used indicator for the quantitative development of educational systems and for human capital formation. However, educational expenditure is often difficult to measure accurately, especially in historical studies. The paper deals with these problems of measurement, using the case of Sweden in the second half of the 19th and the early 20th century as an example.

Official statistics usually provide the main empirical basis for data on educational expenditure. Their aim is to register the social, financial etc. conditions in a certain area as a precondition for modern, rational, bureaucratic modes of governing. The collection of data and the application of statistical categories to social reality possesses a structuring force in itself. The reality created in and through measurement and categorisation that is presented in historical official statistics may thus be in conflict with our analytical requirements. In addition, measurement techniques often still were quite imperfect in the early days of official statistics.

The main problems to be discussed in the paper are:

- incomplete monetarisation of the educational system in the 19th and early 20th centuries, mainly affecting the collection of data on primary schooling,
- the existence of a private sector of education, data on which are scarce, and
- the fact that some public educational institutions possessed sources of income other than the state and municipalities' budgets.

The paper concludes with some remarks on the particular problems these measurement difficulties create in comparative studies.

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1. Introduction¹

The following paper will deal with measurement problems of educational expenditure in Sweden in the second half of the 19th and the early 20th century. Educational expenditure is one of the most important and most widely used quantitative indicators for the development of educational systems and for human capital formation (Cohn and Geske 1990; Hicks 1994). The rise of human capital theory (Klees 1994; Woodhall 1994) and, in more recent times, the new growth theories (Diebolt 2000) have greatly increased the interest in investigating the relationship between educational and economic growth². Also, there seem to be promising – though as yet largely unexplored – pathways of research in the use of indicators like educational expenditure in sociological research on the development of systems of mass schooling.

Particularly in historical studies, however, the use of educational expenditure as an indicator poses grave problems of measurement. Often, the degree of accuracy and representativity of the historical quantitative data is not taken into account properly, leading to unacknowledged distortions in the results. The discussion of statistical methods and results tends to dissociate itself from the question whether it is possible to collect the relevant data in a reliable way at all. At the same time, the presumed status of quantitative data as “hard”, “neutral” facts is upheld, numbers still possess a larger amount of suggestive power, a greater degree of legitimacy compared e.g. with the “soft” facts gained by hermeneutic methods (Waldow 2001).

The main source from which data on educational expenditure can be gathered are official statistics. In many European countries, the systematic production of comprehensive official statistics began in the 18th century³, when special bureaucracies for counting and measuring a wide range of observable facts connected to the geographical, demographic, economic, and social conditions of life were formed⁴. Sweden, for example, was the first country to compile

¹ In part, this paper builds on an earlier article published in this journal; c.f. (Waldow 2001).

² C.f. e.g. Lundgreen’s “classic” study on education and economic development during the industrial revolution in Germany (Lundgreen 1973) and Diebolt’s more recent comparative work on a number of European countries; e.g. (Diebolt 1999). On Sweden, see e.g. the very interesting studies undertaken at the department of economic history at Lund university, e.g. (Nilsson, Pettersson and Svensson 1999).

³ Although the efforts of governments to systematically collect information about the governed population and the conditions of social life are of course much older. C.f. (Burke 2000, pp. 118-138).

⁴ On the emergence of quantifying thinking and official statistics, see (Hacking 1990). The rise of quantification was not confined to the field of politics and administration; in the field of science, too, quantification, i.e. measuring, counting, and the application of statistical

comprehensive population statistics for the whole country (starting in 1749)⁵. The meaning of the term “statistics”, which in the beginning denoted the “phenomena of particular interest of a country or a people” (*Staatsmerkwürdigkeiten eines Landes oder Volkes*)⁶, including quantitative information but by no means synonymous with it, from the late 18th century on was gradually narrowed down to the meaning it possesses today⁷. Especially from the second quarter of the 19th century on, the production of official statistics became an industry of enormous proportions. This “avalanche of printed numbers” (Hacking 1990), as the sociologist Ian Hacking has called it, was at the same time an expression of and a powerful driving force for a fundamental change within the dominant conceptualisation of the world: increasingly, the world was perceived in quantitative and quantifying terms.

The “avalanche of printed numbers” was part of the rationalisation of state power and administration, the shaping of modern, efficient bureaucracies and the formation of modern nation states. Statistics are a precondition of modern, rational, bureaucratic forms of governing. However, the production of official statistics is not just an act of *measuring*, but also of structuring and thus in a sense *creating* – and to a certain degree also normalising – social reality. “Numbers ... actually constitute the domains they appear to represent” (Rose 1999, p. 198). Thus, the reality created in and through measurement and categorisation that is presented in the official statistics may be in conflict with our analytical requirements. In addition, in the early days of official statistics, measurement techniques often still were quite imperfect. In any historical quantifying study, we must be aware of these issues of construction and representation; only with a thorough knowledge of qualitative structures is it possible to arrive at reliable quantifications.

As already mentioned above, the production of official statistics started early in Sweden; in comparison to other countries, both the available amount and the quality of historical quantitative data are quite high (Krantz 1987, p.

methods to the evidence, have become the main defining characteristic of handling evidence and constructing explanations. C.f. (Crombie 1994, vol. 1, pp. 520-529).

⁵ C.f. (Centralbyrån 1999). See also Lönnroth’s remarks on the role of “political arithmetic” in 18th century political economy in Sweden (Lönnroth 1991), especially pp. 18-21.

⁶ Definition by Gottfried Achenwall, one of the founding fathers of German university statistics (Hacking 1990).

⁷ For a long time, the old meaning of “statistics” still resonated in the term. Take for example the subtitle of a comprehensive handbook on a wide variety of aspects of Swedish society, economy, geography and history edited by the famous Swedish statistician Gustav Sundbärg, *Historisk-statistisk handbok (Historical and statistical handbook)* (Sundbärg 1901). This handbook contains some quantitative information, but it mainly consists of descriptions in the form of written texts. An English version, also edited by Sundbärg, was published in 1904 (Sundbärg 1904).

12). Yet, even in Sweden data collection has to struggle with grave difficulties⁸. To these I will now turn.

2. Measuring Educational Expenditure in Sweden

I will now offer an overview of the Swedish educational system as it was structured toward the end of the 19th century and in the early 20th century and point out a number of difficulties encountered when collecting data on educational expenditure for this period. Only the main sectors of the educational system are discussed; some (quantitatively) marginal areas, such as the education of handicapped children, are left out. Also, for reasons of space my discussion cannot make a claim to completeness. The main focus of discussion will be on university finance.

2.1 Primary Schooling

The *folkskolestadga* of 1842 required every Swedish municipality to set up (and finance) a primary school. However, from the middle of the 19th century on, transfer payments by the national administration became more and more important, although (apart from some areas in Northern Sweden) the responsibility for primary schooling remained with the municipalities⁹. The collection of comprehensive statistics on the municipalities' finances began in 1874. For the first years after 1874, i.e. after the collection of comprehensive official statistics on the municipalities' finances had begun, the data compiled in the official statistical records are still comparatively unreliable. During these years, the central statistical office (*Statistiska Centralbyrå*) repeatedly complained about the bad quality, incompleteness and internal inconsistency of the primary data it received from the municipalities (*BiSos U 1874 1877*, pp. I-III; *BiSos U 1875 1878*, p. II; *BiSos U 1876 1879*, pp. I-II). For the time before 1874, municipal educational expenditure on primary schooling can only be estimated. One possible way of doing this is using data on the number of active teachers that were collected every third year (Krantz 1987, p. 90). Of course, this leaves a wide margin for error, especially as there were two categories of teachers within Swedish primary schooling. The *folkskolestadga* had demanded that teachers within *folkskola* had graduated from a teacher seminary. Many municipalities tried to circumvent this by setting up a *småskola* (i.e. literally

⁸ Of course, accurate collection of data is not the only problem; another difficulty is e.g. the transformation of current values into real values. C.f. (Krantz 1994).

⁹ The central state's share increased particularly after the introduction of a system of school inspectors which revealed that there were large differences in the provision of schooling due to the very diverse financial situation of the different municipalities. C.f. (Wallin 1978, particularly pp. 385, 391).

“small school“), a type of school that had not been envisaged in the *folkskolestadga*. Teachers at this type of school usually did not possess formal qualifications and earned much lower salaries than their colleagues at *folkskola*. Only in the late 1850s and early 1860s was the existence of the *småskolor* acknowledged by the state and this school type integrated into the system as a preparatory stage to the *folkskola* (Wallin 1978, p. 391). Reliable data on the distribution of teachers between *folk-* and *småskola* are only available from the middle of the 1860s on (*BiSos P 1868 1870*, p. XII).

A major difficulty is constituted by the fact that part of the teachers' salaries were paid in kind. The *folkskolestadga* made certain specifications concerning these payments in kind; however, payments could differ quite considerably in individual cases¹⁰. In the case of the *småskolor*, what exactly was paid in kind was a matter of negotiation between individual teachers and individual parishes before 1871 (Sörensen 1942, p. 299f.). This makes data collection extremely difficult. The system of paying part of teachers' salaries in kind survived well into the 20th century; it was finally abolished only in 1937 (Fredriksson, Hofstedt and Paradis 1950, pp. 307f.). Even if it were possible to arrive at a good estimation of the part of the wages paid in kind in the primary system, the transformation of amounts paid in kind into monetary values is very problematic (Krantz 1987, p. 91).

Private primary schools tend to be disregarded by researchers on Swedish primary schooling in the late 19th century. Often, these schools had survived from the time before the *folkskolestadga* or had been set up by factory owners etc. In addition, in the 1860s and 70s a number of dissenting primary schools appeared. It is difficult to obtain reliable data on private primary schooling, but the evidence there is suggests that significant numbers of pupils attended these schools. In Stockholm, according to (Sörensen 1942, p. 196) about 25 % of the relevant age group attended private schools instead of public ones in the late 1860s. It has to be admitted, though, that Stockholm may be a special case.

2.2 Secondary Schooling

Unlike primary schooling, secondary schooling in Sweden segregated girls and boys in the second half of the 19th century and the early 20th century. The central state was the main provider of secondary schooling for boys (in the *allmänna läroverk* and, quantitatively less important, the *pedagogier*). Public secondary schooling was not entirely free of charge, but fees were very moder-

¹⁰ The specifications made in the *folkskolestadga* left a lot of room for interpretation. E.g., one of these specifications was that teachers should receive fodder to sustain one cow (or alternatively a certain amount of grain). The question of exactly how much this was supposed to be was a constant source of conflict within the municipalities, the repercussions of these conflicts repeatedly reaching parliament. Cow fodder was finally converted into a monetary payment in 1900 (Sörensen 1942, pp. 295f.).

ate in the 19th century, and poor pupils could get a reduction of fees or be exempted altogether¹¹. In the second half of the 19th century, there was a debate on the introduction of regular tuition fees in order to save public money, which resulted in the introduction of somewhat increased tuition fees in the 1905 secondary school reform (Florin and Johansson 1990, pp. 516f.).

The state budget's share accounts for the main part of the expenses of boys secondary schools; fees and endowments, however, provided an additional source of income for these schools and thus an additional source of educational expenditure. These resources fell into the responsibility partly of the church and partly of the schools themselves, which makes it difficult to include them in an estimation of educational expenditure. Widell provides data for the schools' endowments from 1870 to the end of the 19th century. According to these data, endowments played only a very minor role in 1870; endowments made up only a mere 3 % of the amount of money coming directly from the state budget. The absolute amount of the endowments' contribution remained roughly on the same level from 1870 to 1900, so it seems to be a plausible assumption that the figure was about the same for the time before 1870. As state expenditure on secondary schooling expanded rapidly in the second half of the 19th century, this means that the endowments' share proportionally was much higher earlier in the century, if the stationarity assumption is true. If the endowments' yields were roughly as high in 1850 as in 1870, this would bring them up to about 22 % of the amount coming directly from the state budget (Widell 1900, pp. 132-134) for 1850. Thus, for the time before about 1860, endowments did play an important role in the financing of secondary schooling and cannot be disregarded in the collection of data.

Secondary schooling for girls was provided privately¹². Private girls' schools could obtain some financial support from the central state (starting in the 1870s), the municipalities and the provinces (*landsting*)¹³, but they mainly financed their operation through tuition fees. In the middle of the 1880s, these could go up to 300 *kronor* per school year, although they usually ranged from about 100 to 200 *kronor* (*Elever i icke-obligatoriska skolor* 1977, p. 49). This compares to an amount of total expenditure per (male) pupil in the public *allmänna läroverk* in 1885 of about 213 *kronor* per year¹⁴. As one has to add

¹¹ According to regulations introduced in 1878, the enrolment fee was 11 kr. To this was added a yearly tuition fee of 9,50 kr and a variable contribution for lighting and heating, which e.g. at Västerås *högre allmänna läroverk* at the end of the 19th century fluctuated between 5,50 kr and 10,50 kr (Florin and Johansson 1990, p. 517).

¹² With the exception of the normal school for girls in Stockholm, founded in 1864.

¹³ In some cases also banks and even liquor firms. C.f. (Richardson 1980, p. 10) and (Richardson 1999, p. 52).

¹⁴ Calculation based on (*Kapital-konto till riks-hufvud-boken*. various years) and (*Elever i icke-obligatoriska skolor* 1977); endowments, tuition fees, etc. are *not* included in the calculation, so the real figure is somewhat higher. Enrolment data include pupils of classes 1 to 7:2 of the *allmänna läroverk*.

the public subsidies to the tuition fees in order to arrive at expenditure per pupil for the girls' secondary schools, one can easily see that in purely quantitative terms, i.e. only judging from the financial input, secondary education for girls was roughly of the same quality as that for boys¹⁵. This becomes particularly clear if expenditure per pupil in the secondary sector is compared to expenditure per pupil in the primary sector, where expenditure per pupil lay at about 17 kr¹⁶.

According to the report of a government committee set up to investigate secondary schooling for girls in the middle of the 1880s, about 7.000 girls attended girls' secondary schools in grades comparable to those of boys' secondary schools at that time. This means that the number of female pupils in secondary education was no less than roughly half the number of male pupils (about 14.000 in the relevant grades of the *läroverk* and *pedagogier*). The number of female pupils was probably even higher than the figure given, as the mentioned government committee encountered grave difficulties in the collection of data, which probably led to an underestimation of female enrolment (*Elever i icke-obligatoriska skolor* 1977, p. 49).

Private secondary schools for boys also played a certain role in the 19th and early 20th centuries; however, it is even more difficult to obtain reliable data on these schools than on private secondary schools for girls (*Elever i icke-obligatoriska skolor* 1977, p. 59).

Another aspect that is very difficult to take into account in an estimation of expenditure on secondary schooling is private tuition, especially in the early 19th century. As in the whole of Europe, primary and secondary schooling constituted two separate systems that were sharply divided from each other. The majority of secondary students had not attended *folkskola*, but were prepared privately (Richardson 1999, p. 69). Also, there were private instructors substituting for regular secondary schools. But not only in private households could private instructors be found; also within public secondary schools, private tutoring, both by teachers and senior pupils, was widespread. Private tuition helped supplement the essentially classical curriculum with the more "modern" subjects like natural sciences and modern languages, and also provided an additional means of income for teachers, who in the early 19th century were very badly paid (Platen 1981, pp. 12, 17).

Thus, contrary to received wisdom, the private sector did play a significant role within the Swedish educational system, particularly in the secondary sector. Due to the scarcity of data, however, it is very difficult to estimate the

¹⁵ The content of the curriculum, though, was quite different (Richardson 1980, p. 10); however, in the end of the 19th century, some girls' schools went co educative, mainly for economic reasons (Nordström 1987, pp. 61f.).

¹⁶ (*Elever i obligatoriska skolor* 1974) and (Krantz 1987); enrolment data include pupils in *småskolor*, *mindre folkskolor*, *folkskolor* and *högre folkskolor*.

exact contribution of the secondary sector to human capital formation, or at least the error incurred by disregarding this sector.

2.3 *fackskolor* (Vocational, Technical, Agricultural Schools)

The sector of technical, agricultural and vocational schools (*fackskolor*) offers a very diverse image as concerns its patterns of financing in the late 19th and early 20th centuries. Some of these schools were founded by the state, but a number of them were originally founded by private initiative or professional associations and only later came into the state's domain¹⁷. Responsibility for these schools often lay with ministries other than that of cultural affairs, and consequently expenditure for these schools is often listed under budget titles other than education and is sometimes difficult to separate from non-educational expenditure. Many of these schools possessed sources of income (and thus of expenditure) other than the state budget. Widell provides some data on the financial conditions of some of these schools in the late 19th century (Widell 1900, pp. 146-149). According to these data, the amount of money coming from sources other than the state budget was 23 % on average both in 1850 and in 1897, with considerable variation between different schools; also, the fact that the aggregate average for all *fackskolor* is roughly the same both in 1850 and in 1897 disguises that the pattern of financing of individual schools could change significantly from the middle to the end of the 19th century (Widell 1900).

2.4 Universities

In addition to the two ancient universities of Uppsala and Lund, Sweden acquired two new university-level institutions in the period discussed in this paper, the *högskolor* of Stockholm (founded 1877) and Göteborg (founded 1891). These new institutions of higher education were financed partly by endowments and donations, partly also by grants from the cities in which they were located (on the history of Stockholm and Göteborg högskola c.f. Bedoire and Thullberg 1987; Lindberg and Nilsson 1996).

In the following, I will concentrate my remarks on the ancient universities of Lund and Uppsala, whose traditional main source of finance had been their endowments, which mainly stemmed from Gustav II. Adolf's time. From the early 19th century on, however, these resources were no longer sufficient, so in the 1830s the state stepped in, gradually increasing its payments, until the state budget became the main source of finance for these universities. In the course

¹⁷ A good example is the apothecaries' school, *Farmaceutiska institutet*, which was founded in 1837 by the apothecaries' society and in 1881 was taken over by the state (Ekström and Danielsson 1987).

of the 20th century, the endowments' share within university finance was reduced to marginality. There is no detailed, quantitative account of the replacement of the traditional mode of university financing¹⁸.

Figure 1: university expenditure directly from state budget 1860-1895

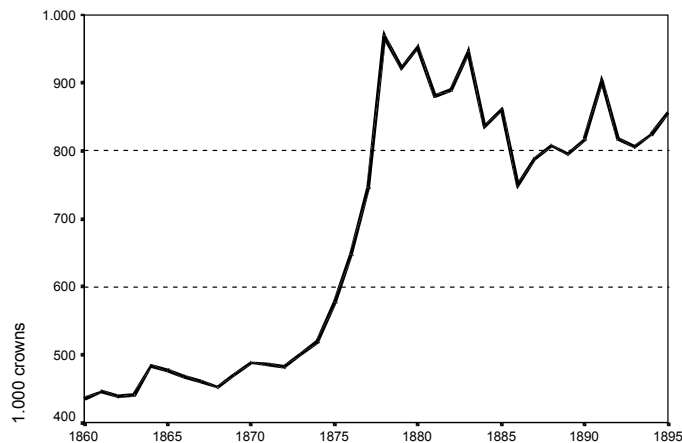


Figure 1 shows the development of university expenditure paid directly from the state budget (compiled from *Kapital-konto till riks-hufvud-boken*, various years):

A slow increase up to the middle of the 1870s is discernible, then a sharp increase until about 1880, after that a stagnation or even decline¹⁹. If one focuses only on these data, a researcher is bound to conclude that the universities' financial situation was worsening towards the end of the century.

If in addition to direct state funding the financial means coming from other sources – such as endowments – are included, the picture changes significantly²⁰:

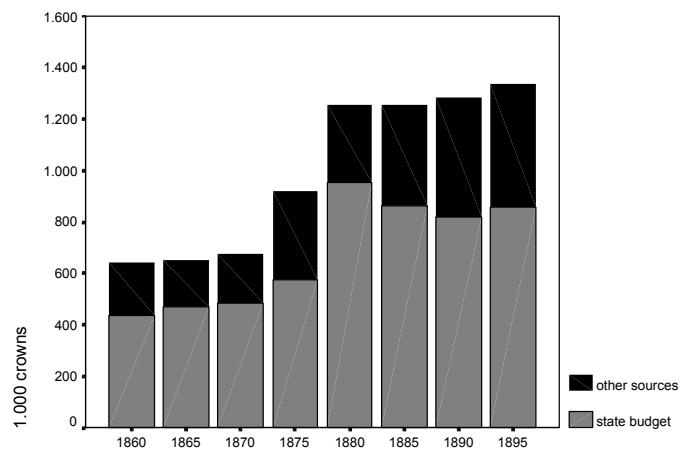
If we include sources of finance other than the state budget, obviously there is no decline in university expenditure after 1880 but, on the contrary, an increase. Admittedly, the increase of total university expenditure after 1880 is

¹⁸ Not even Jörgen Weibull, whose substantive volume on the development of Lund university from 1868 to 1968 presents a lot of quantitative information, includes a detailed discussion of this process (Weibull 1968).

¹⁹ Speaking of a decline despite the fact that educational expenses stay roughly on the same level seems justified, as, first, the data are not deflated and, second, the general trend of nearly all curves of educational expenses in the different sectors shows an underlying trend of comparatively strong growth.

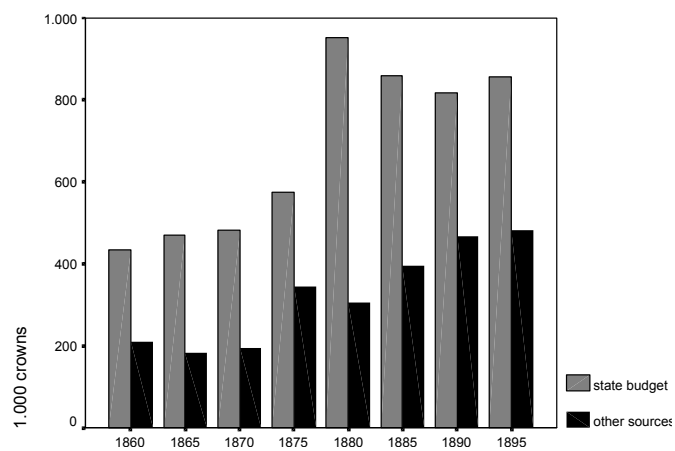
²⁰ The data on "other sources" were taken from (Widell 1900). More detailed information on the universities' financial conditions can be found in the university yearbooks.

Figure 2: source of university expenditure 1860-1895 - a



much weaker than the increase in the decade from 1870-1880; still, figure 2 shows a development that differs considerably from the picture shown in figure 1. In a direct comparison of the part of university finances that was paid directly from the state budget and of the part coming from other sources, it is possible to see even more clearly how the changes in direct state funding to a

Figure 3: sources of university expenditure 1860-1895 - b



certain extent are offset by alternative funding:

Compensation effects can be discerned quite clearly. The increase in the money coming directly from the state 1855-1860 is evened out by a decrease in the share coming from other sources. Even more clearly, it is possible to see how the decrease of the amount of money coming from the state budget from 1880 on is compensated by an increase in the amount of money coming from other sources. These questions cannot be discussed in detail here, but the fluctuations in the amount of money coming from sources other than the state budget are probably mainly due to the varying returns from the universities' endowments through the rise and fall of grain prices (Gierow 1971; Helmer 1989; Thoré 2001; Weibull 1968).

2.5 Other

A characteristic feature of Scandinavian educational systems that also creates special difficulties in the collection of quantitative data on public educational expenditure are the so-called *folkhögskolor* (folk high schools). Following the Danish example, these schools were founded from 1868 on in Sweden by local initiative. From the early 20th century on, also the *folkrörelse* – i.e. the folk movements such as the Temperance Movement, the Free Church Movement and the Workers' Movement – founded *folkhögskolor*. The financing of these schools differed from case to case. While a number of them received subsidies by the state, the municipalities or the provinces, a large share of their budget came from other sources. Some of the schools founded by the *folkrörelse* were exclusively financed by these movements²¹.

One major public provider of education that is not part of the educational system proper is often ignored in historical investigations of human capital formation: the military. Both soldiers' training – particularly after the introduction of conscription in the beginning of the 20th century – and the training of specialists in special military and naval schools is relevant to human capital formation. Some of these schools educated not only future military specialists, but also civil engineers (hence the name *civil* engineer, *civilingenjör* in Swedish, which was originally meant to distinguish this group from the military engineers educated in the same schools). The military's contribution to human capital formation is extremely difficult to assess; as far as I can see, this is a field of study that still needs to be investigated more closely, both theoretically and empirically²².

²¹ Such as Brunnsvik, founded 1906 by the workers' movement. A number of Brunnsvik's pupils later became prominent politicians and journalists. C.f. (Berggren 1988).

²² The volume on the late 19th and early 20th centuries of the *Handbuch der deutschen Bildungsgeschichte* [Handbook of History of Education in Germany] has a chapter on the education by and through the military (Berg 1991, pp. 501-527).

3. Conclusion

At first sight, many of the observations made in this paper do not seem breathtaking. It is a well known fact that the Swedish universities possessed endowments (albeit much smaller ones than the old English universities or the American universities) that provided a certain income beside the money coming from the state budget even after endowments had ceased to be the universities' principal resource. Also, the compensation of financial shortages caused by a decline of state funding through money coming from other sources seems a quite simple mechanism. Neither is it a secret that secondary education for girls was provided and financed privately and that teachers' salaries were much lower in *småskolor* than in *folkskolor*. The fact remains, however, that although facts such as these often are known to historians of education, they tend to be ignored by economists of education that are exclusively concerned with quantitative investigation²³. And the problems discussed in this paper pertain by no means only to the case of Sweden. As we have seen, it is extremely difficult to reliably reconstruct educational expenditure even for this case, i.e. a small, highly centralised country with an educational sector that is overwhelmingly public and that possesses official statistics renowned for their accuracy. Conditions become much worse in the case of educational systems with a large non-public or semi-public sector, e.g. many Southern European countries or Great Britain, where a large part of the educational system was (and still is) run privately or by the church. Due to the fact that historical source material on the non-public part of the educational system tends to be scarce and scattered to different archives, it is often very difficult to collect the data for this part of the educational system. In the countries that possess a large non-public sector, time series of the development of public expenditure on education are even less representative for the development of the system as a whole. In the case of many countries (e.g. Spain) it is not even possible to arrive at a rough estimate of the proportion of the educational system that was non-public. Thus, it is an important caveat that applies to the historical study of any educational system that we have to take into account the existence and sometimes remarkable longevity of features of the educational system and certain modes of financing education that have later vanished within the course of the development of the educational system, e.g. the financing of universities through endowments or the importance of private secondary schools. In addition to the underestimation of educational expenses at a given time, the increase of the trend is overestimated if these features are ignored: As it seems plausible to suppose that in the course of time these modes of financing education will decrease in favour of a

²³ Steven Klees has pointed to the remarkable degree to which many practitioners of mainstream economics and economics of education tend to ignore criticism of their methods and theoretical assumptions. C.f. (Klees 1991, pp. 729-733).

mode of financing through the public budgets²⁴, the coverage of educational expenditure within official statistics will most likely become more complete over time. This means that if certain services are successively included in the time series that were already in existence but left out before, i.e. if there is no real increase in volume, but only a change in the mode of financing, the increase of educational expenditure is distorted upwards. A good example are girls' secondary schools in Sweden, the operation of which was increasingly subsidised and finally taken over by the state in the 20th century²⁵.

Using only the state budget and easily available official statistics as a source for educational expenditure, as is often done in economics of education, may result in a very distorted picture of total expenditure on education and consequently of the quantitative development of this part of the educational system and the formation of human capital. Of course, the data on public educational expenditure collected from these sources do provide valuable insights into the quantitative development of educational systems. Also, in the case of most countries in continental Europe, they cover the lion's share of total expenditure on education. Yet, we should not be lured into trusting these data too far; even in the case of Sweden, where conditions for data collection are good, they are a very incomplete indicator of the total growth of the educational system and total human capital formation. It has already been mentioned how numbers and quantification in official statistics not only chart their fields, but also in a certain way create what they purport to measure (Rose 1999). Thus, the image of "education" presented in the official statistics may not be identical with our conceptions of education; we should not be fooled by the categories of official statistics. The comprehensiveness of historical official statistics suggests a degree of completeness and accuracy that is not necessarily really warranted.

Thus, all time series of public expenditure on education misrepresent the development of the system as a whole in a certain way and, what is perhaps even more important, they all misrepresent the development of the system as a whole in a *different* way, depending on the particular build-up and the particular pattern of financing of the educational system studied. This means that the problem of representativity and accuracy is systematically aggravated in comparative studies. Due to the differences in the systemic pattern of different systems of education, in most cases public expenditure on education in one country cannot be treated as functional equivalent of public expenditure on education in another. In this light, Claude Diebolt's assertion that for an international comparison of the educational expenses of different countries it is important to use standardised definitions (Diebolt 1996, p. 76) perhaps needs to be specified more clearly: When comparing data from different systems of education, standardising the definitions must not remain on the level of mere

²⁴ As we have seen, however, this process is far from linear.

²⁵ There are similar pitfalls in the treatment of domestic services in the construction of historical national accounts. C.f. (Krantz 1994).

names. Only collecting the data according to standardised “labels” (e.g. “only public expenditure” etc.) is more a sign of a methodological fetish than of methodological rigour. Instead, standardising the definitions will usually have to mean identifying *functional equivalents* and comparing these²⁶. For this, an intimate knowledge of the qualitative structural properties and system of financing of the studied educational systems is necessary.

I would like to conclude by urging that we should subject our historical quantitative data to the same critical standards we usually apply to source material that takes the form of texts; quantitative data are not *per se* less “soft” than verbal texts. In historical studies on the development of human capital formation and its role in the process of economic development (or indeed in any historical study involving the use of quantitative data), it is not sufficient to examine the methods used and the explanations offered from a mathematical-statistical point of view; it is also necessary to assess the degree of accuracy and the epistemological status of the data: “The apparent facticity of the figure obscures the complex technical work that is required to *produce* objectivity” (Rose 1999, p. 208). The structural limitations and the conditions of production of the evidence have to be taken into account; in order to do this, we need an intimate knowledge of the *qualitative* structures and history of the educational systems studied. Instead of the imperative of more and more sophisticated methods, what we badly need is a reconstructed relationship to our sources and a firmer empirical rooting of our research.

4. References

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²⁶ To be sure, the need to compare functional, not nominal equivalents also applies to qualitative comparisons (Haupt and Kocka 1996). Functional equivalents *can* of course be identical with nominal equivalents in certain cases, depending on the studied phenomena and on the research question. Also, it should be noted that with the change of educational systems over time, relations of functional equivalence, too, change. C.f. also Heinz-Werner Hetmeier's discussion of the difficulties connected to the compilation of the OECD educational statistics (Hetmeier 2000, p. 24), and Jean-Claude Eicher's remarks on the comparability of international data on educational expenses in (Eicher 1995, p. 444).

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